

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently amended): A welding system including:

a wire feeding unit which feeds a welding wire to a welding torch;

an actuator which holds the welding torch and moves the welding torch;

a controller which has a position control system and drive-controls the actuator; and

a welding power supply unit which applies weld output between a workpiece and the welding wire, wherein the welding torch is moved by the actuator in a direction separating from the workpiece thereby to control the velocity of the welding wire for the workpiece; and

the controller includes, separately from the position control system, a dedicated separation control system which moves the actuator only in the direction where the welding torch is separated from the workpiece; and

the dedicated separation control system is always connected to the position control system, and the controller outputs a velocity command relating to a welding torch pull-up operation

to the dedicated separation control system ~~only when the welding torch is moved in the direction separating from the workpiece~~ and outputs a velocity command relating to an operation other than the welding torch pull-up operation to the position control system without the dedicated separation control system.

Claim 2 (Previously presented): The welding system according to claim 1, wherein the dedicated separation control system performs feedforward control.

Claim 3 (Cancelled)

Claim 4 (Previously presented): A method of preventing erroneous collision detection within a multi-articulated robot driven through a reduction gear by a motor utilizing the welding system according to claim 1, comprising the steps of:

sensor-less detecting external force due to collision by subtracting a kinetic torque obtained by an inverse kinetic calculation of a robot from a torque outputted to the reduction gear by the motor;

judging that an arm has received the external force in case that the detected value of the external force is greater than a predetermined threshold; and

increasing the threshold for detection of collision to lower collision detecting sensibility in case that a command acceleration of the robot operation is greater than a predetermined value.

Claim 5 (Original): The welding system according to claim 4, wherein the threshold for detection of collision is increased, and this state where the threshold is increased is kept for the predetermined time in case that the command acceleration of the robot operation is greater than the predetermined value.

Claim 6 (Currently amended): A consumable electrode type welding method, which, by means of a welding system including a wire feeding unit which supplies a welding wire to a welding torch, an actuator which holds the welding torch and moves the welding torch, a controller which has a position control system and drive-controls the actuator, and a welding power supply unit which applies weld output between a workpiece and the welding wire, moves the welding torch by the actuator in a direction separating from the workpiece, thereby to control the velocity of the welding wire for the workpiece, in that the controller includes, separately from the position control system, a dedicated separation control system for moving the actuator only

in the direction where the welding torch is separated from the workpiece; and

the dedicated separation control system is always connected to the position control system, and a velocity command relating to a welding torch pull-up operation is outputted to the dedicated separation control system ~~only when the welding torch is moved in the direction separating from the workpiece and a~~ velocity command relating to an operation other than the welding torch pull-up operation is outputted to the position control system without the dedicated separation control system.

Claim 7 (Previously presented): The consumable electrode type welding method according to claim 6, wherein the dedicated separation control system performs feedforward control.

Claim 8 (Cancelled)

Claim 9 (Previously presented): The consumable electrode type welding method according to claim 6, wherein a multi-articulated robot, which is driven through a reduction gear by a motor, is used to prevent erroneous collision detection, the method comprising the steps of:

sensorless detecting external force due to collision by subtracting a kinetic torque obtained by an inverse kinetic

calculation of a robot from a torque outputted to the reduction gear by the motor; judging that an arm has received the external force in case that the detected value of the external force is greater than a predetermined threshold; and

increasing the threshold for detection of collision to lower collision detecting sensibility in case that a command acceleration of the robot operation is greater than a predetermined value.

Claim 10 (Previously presented): The consumable electrode welding method according to claim 6, in case that the command acceleration of the robot operation is greater than the predetermined value, the threshold for detection of collision is increased, and this state where the threshold is increased is kept for the predetermined time.

Claim 11 (Previously presented): The welding system according to claim 1, wherein the welding torch is moved by the actuator in the direction separating from the workpiece while the welding is fed toward the workpiece.

Claim 12 (Previously presented): The welding system according to claim 1, wherein the controller continues to output the velocity command relating to the welding torch pull-up

operation to the dedicated separation control system until the welding torch is moved in a predetermined height after the welding wire contacts the workpiece.

Claim 13 (Previously presented): The welding system according to claim 1, wherein the velocity command relating to the welding torch pull-up operation outputted to the dedicated separation control system is separate from a velocity command in a usual operation outputted to the position control system.

Claim 14 (Previously presented): The consumable electrode welding method according to claim 6, wherein the welding torch is moved by the actuator in the direction separating from the workpiece while the welding is fed toward the workpiece.

Claim 15 (Previously presented): The consumable electrode welding method according to claim 6, wherein the velocity command relating to the welding torch pull-up operation continues to be outputted to the dedicated separation control system until the welding torch is moved in a predetermined height after the welding wire contacts the workpiece.

Claim 16 (Previously presented): The consumable electrode welding method according to claim 6, wherein the velocity

command relating to the welding torch pull-up operation outputted to the dedicated separation control system is separate from a velocity command in a usual operation outputted to the position control system.

Claim 17 (New): The welding system according to claim 1, wherein the controller controls an operation direction of the welding torch to be only the direction separating the welding torch from the workpiece.

Claim 18 (New): The consumable electrode welding method according to claim 6, wherein the controller controls an operation direction of the welding torch to be only the direction separating the welding torch from the workpiece.

Claim 19 (New): The welding system according to claim 2, wherein respective gains of the velocity command relating to the welding torch pull-up operation and the velocity command relating to the operation other than the welding torch pull-up operation are separately changed to perform the feed-forward control.

Claim 20 (New): The consumable electrode type welding method according to claim 7, wherein respective gains of the

velocity command relating to the welding torch pull-up operation and the velocity command relating to the operation other than the welding torch pull-up operation are separately changed to perform the feed-forward control.